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EXAMINER

KACKAR, RAM N

ART UNIT PAPER NUMBER

1763

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/621,049

Applicant(s)

LIU, HENG

Examiner

Ram N Kackar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-160 is/are pending in the application.
- 4a) Of the above claim(s) 9-19, 63-103, 112-118, 124-128 and 131-160 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 20-62, 104-111, 119-123, 129 and 130 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-160 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01/20/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  1. Claims 1-8, 20-62, 104-111, 119-123 and 129-130 drawn to an apparatus, classified in class 118, subclass 715.
  2. Claims 9-19, 63-103, 112-118, 124-128, 131-132 and 160 drawn to a method, classified in class 427, subclass 585.
  3. Claims 133-141, drawn to product 1, classified in class 257, subclass 40.
  4. Claims 142-150, drawn to product 2, classified in class 257, subclass 40.
  5. Claims 151-159, drawn to product 3, classified in class 362, subclass 800.
2. Inventions of Group 1 and 2 are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus could be used for etching, deposition or heat treatment and the process could be done by a materially different apparatus.
3. Inventions of group 2 and Group 3-5 are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the chemical vapor deposition could be used to make solid state devices, medical devices and protective devices etc.

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4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Mr. Norman Carte on 11/26/2003 a provisional election was made with traverse to prosecute the invention of Group 1, claims 1-8, 20-62, 104-111, 119-123 and 129-130. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-19, 63-103, 112-118, 124-128 and 131-160 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claim 52 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that

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the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance the description does not disclose or show by drawing any structure associated with heater purge system.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-5, 7-8, 20-24, 28-31, 35-41, 44-50, 61, 104-108 and 119-122 are rejected under 35 U.S.C. 102(b) as being anticipated by Jurgensen et al (WO 02/18672). Following references are from English publication (US 2003/0221624).

Jurgensen et al disclose a CVD coating device having a rotatable wafer carrier (Fig 1 and paragraph 7) sealed at a periphery to facilitate laminar flow (Fig 1), bottom of the chamber defined by the carrier (Fig 1-3), heater outside the chamber (19) to heat the carrier, gas inlet located centrally (26) and gas outlets above the carrier (25), a shaft for rotating the wafer carrier (23), a small distance from carrier to the cover (Fig 1) and a graphite discharge ring (Col 1 lines 8-13).

Regarding claims 106-108 the rotational speed of the carrier is an intended use limitation and does not point to any additional structure and therefore carries no patentable weight.

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11. Claims 20-24, 29, 35-39, 46-49, 51-52, 104-106, 119-120 and 123 are rejected under 35 U.S.C. 102(b) as being anticipated by MacLeish (US 6113984)

MacLeish et al disclose a CVD coating device having a rotatable wafer carrier (Fig 14-116, Fig 1-48 ) sealed at a periphery to facilitate laminar flow (Abstract , Fig 14-130 and Col 14 lines 55-59), bottom of the chamber defined by the carrier (Fig 14-115, Fig 1-50 ), heater outside the chamber (Fig 2-44 and Fig 14-124) to heat the carrier, a shaft for rotating the wafer carrier (Fig 14-116, Fig 1-48) and a small distance from carrier to top (Fig 14-106, Fig 1-34a)

Regarding claims 106-108 the rotational speed of the carrier is an intended use limitation and does not point to any additional structure and therefore carries no patentable weight.

Regarding claim 52 MacLeish discloses purge of the area outside of reaction chamber 34a (Col 9 lines 53-60).

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 25-27 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Ikeda et al (US 6143077).

Jurgensen et al disclose a CVD coating device having a rotatable wafer carrier (Fig 1 and paragraph 7) sealed at a periphery to facilitate laminar flow (Fig 1), bottom of the chamber defined by the carrier (Fig 1-3), heater outside the chamber (19) to heat the carrier, gas inlet

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located centrally (26) and gas outlets above the carrier (25), a shaft for rotating the wafer carrier (23), a small distance from carrier to the cover (Fig 1) and a graphite discharge ring (Col 1 lines 8-13).

Jurgensen et al do not disclose the distance between the wafer carrier and top of reaction chamber and gas inlet diameter.

Ikeda et al disclose a source gas delivery system for a CVD coming centrally from top like in the apparatus of Jurgensen and disclose that the diameter of the gas inlet could be between  $1/30$  to  $1/3$  of the size of a wafer surface which for 8 inch diameter would be from 0.26- 2.6 inch (Col 8 lines 59-63). Similarly the height of chamber could be more than 0.36 –1.6 inches to allow for laminar flow.

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to design and optimize inlet diameter and chamber spacing for laminar flow using the teachings of Ikeda et al.

14. Claims 6, 53-60, 109-111 and 129-130 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Hirooka et al (US 4798166).

Jurgensen et al disclose a CVD coating device having a rotatable wafer carrier (Fig 1 and paragraph 7) sealed at a periphery to facilitate laminar flow (Fig 1), bottom of the chamber defined by the carrier (Fig 1-3), heater outside the chamber (19) to heat the carrier, gas inlet located centrally (26) and gas outlets above the carrier (25), a shaft for rotating the wafer carrier

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(23), a small distance from carrier to the cover (Fig 1) and a graphite discharge ring (Col 1 lines 8-13).

Jurgensen et al do not disclose the details of gas inlet structure for multiple chambers connected to same source for increased throughput.

Hirooka et al disclose a continuous deposition system having multiple chambers connected in parallel to a common source of gas (Fig 1) and disclose several ways of connecting gas supplies before entering the chamber (Fig 1) which includes pre-mixing as well as mixing only at the entrance of the chamber through concentric tubes (a, b, c).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to design and optimize gas supply system in order to meet process requirement as per the teaching of prior art as exemplified by Hirooka et al.

15. Claims 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Ikeda et al (JP62211914).

Jurgensen et al disclose a CVD coating device having a rotatable wafer carrier (Fig 1 and paragraph 7) sealed at a periphery to facilitate laminar flow (Fig 1), bottom of the chamber defined by the carrier (Fig 1-3), heater outside the chamber (19) to heat the carrier, gas inlet located centrally (26) and gas outlets above the carrier (25), a shaft for rotating the wafer carrier (23), a small distance from carrier to the cover (Fig 1) and a graphite discharge ring (Col 1 lines 8-13).

Jurgensen et al disclose discharge ring for allowing gases to pass symmetrically over the substrate but do not disclose that the outlets through a hollow ring to collect for disposal.



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Ikeda et al disclose a diffuser which is a hollow ring with plurality of inlets and outlets (Fig 2 B and C).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use a hollow ring to guide exhaust gases out of the chamber in order to have an orderly and laminar removal of exhaust gases.

16. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Fujii et al (US 4980204).

Jurgensen et al disclose a CVD coating device having gas inlet located centrally (26) and depend upon has distribution using symmetrical flow patten but do not disclose plurality of gas inlets spaced at different location of the substrate.

Fujii et al disclose plurality of gas inlets spaced at different locations of the substrate for even more precise control for specific location of substrate.

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use the specific arrangement of gas inlets in order to get location specific control of deposition by following the teaching of Fujii et al.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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